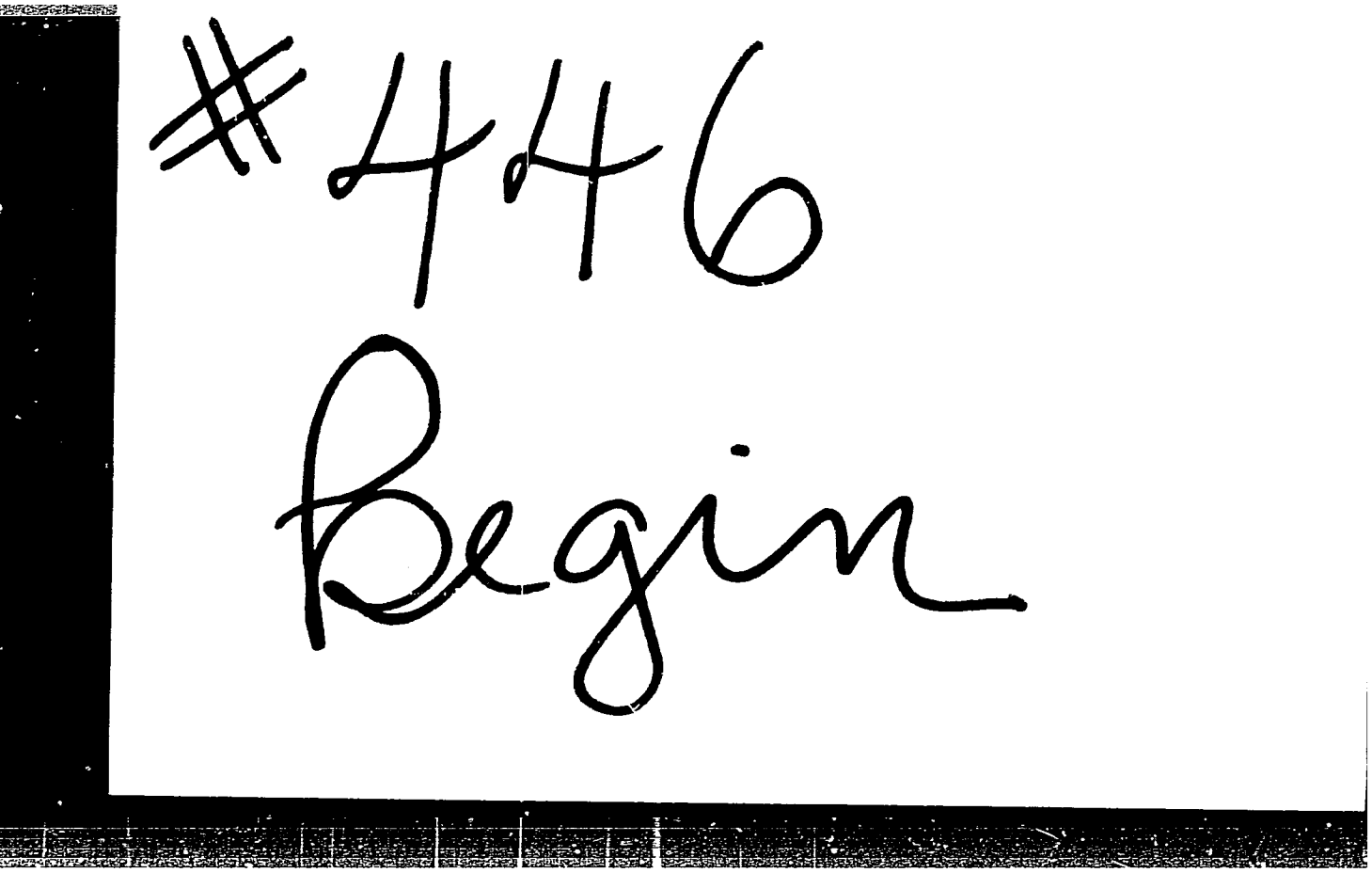

#446 NOTE:

Presnyakov, A.A.

is continued

from reel #445.

S/137/62/000/004/061/201
A052/A101

AUTHORS: Presnyakov, A. A., Vinnitskiy, A. A.

TITLE: On the method of determining the coefficient of external friction by means of conical strikers

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 4, 1962, 4, abstract 4D17 (Tr. In-ta yadern. fiz. AN KazSSR, no. 4, 1961, 97 - 99)

TEXT: The method of determining the coefficient of external friction by means of conical strikers is discussed. The uniformity of deformation of cylindric samples by conical strikers is secured by counterbalancing the effect of a number of factors acting in different directions in the process of deformation. On the basis of the fact that the samples preserve their cylindricity, one can not judge on the value of the coefficient of external friction. The method of conical strikers is fundamentally a faulty one.

K. Ursova

[Abstracter's note: Complete translation]

Card 1/1

S/137/62/000/004/060/201
A052/A101

1300

AUTHORS: Presnyakov, A. A., Vinnitskiy, A. A.

TITLE: Method of determining specific frictional forces at rolling

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 4, 1962, 4, abstract 4D16 (Tr. In-ta yadern. fiz. AN KazSSR, no. 4, 1961, 100 - 101)

TEXT: The process of plastic deformation at rolling is greatly influenced by the external friction between the deformed metal and the rolls. A device (a slitted roll) is designed to study the frictional forces in the seat of deformation in the process of rolling. The scheme of the device and its mode of operation are presented. Simultaneously with the measurement of frictional forces, the change of the true specific pressure is measured by means of a special device the roll of which has a built-in dynamometer with carbon pickups. The total pressure of metal on rolls is measured with dynamometers installed under pressing screws of the rolling mill. On differentiating the curve obtained on the device, the curve for distribution of specific frictional forces over the grip hold arc is found. Having the curve for distribution of specific pressures it is possible

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S/137/62/000/004/060/201
A052/A101

Method of determining...

to obtain a diagram of distribution of coefficients of friction in the seat of deformation in the process of rolling.

K. Ursova

[Abstracter's note: Complete translation]

Card 2/2

28877

18.1245 2408 1530

S/180/61/000/004/015/020
E073/E535

AUTHORS: Kasymbekova, K.K. and Presnyakov, A.A. (Alma-Ata)

TITLE: On the plasticity of ordering alloys of the system magnesium-cadmium

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1961, No.4, pp.101-102

TEXT: By numerous investigations of the Mg-Cd system the existence of the following three compounds, forming from the solid solution as a result of ordering during lowering of the temperature, was established: Mg_3Cd, MgCd, $MgCd_3$. Ye. M. Savitskiy and V. V. Baron (Ref.1: Izv.AN SSSR, OKhN, 1952, No.3, 392-396) found that all the three compounds form considerable ranges of homogeneity and have a high ductility combined with a low hardness. However, these authors did not carry out a systematic investigation of the properties of these compounds with changing temperatures. This paper is devoted to studying the mechanical properties of the above mentioned compounds, which form during the process of ordering and are nearest in structure to solid solutions. All the three compounds were studied in the as-cast state and the compound MgCd was also investigated in the homogenized state. The alloys

Card 1/6

were melted in a graphite crucible using a carnallite flux. Magnesium and cadmium were used as charge materials. From the cast blanks specimens for tensile tests were machined with a gauge length of 20 mm and a diameter of 5 mm; the tests were made with a loading speed of 1 to 2 mm/min. Specimens from an alloy with a composition approaching the stoichiometric MgCd composition were homogenized for 145 hours at 210°C. The test technique was the same for all the specimens: heating to the desired temperature in 10 min, holding at that temperature for 30 min, fracturing. The contraction was taken as a measure of the plasticity. The Mg_3Cd compound was most thoroughly investigated in the temperature range 125-400°C; the compound MgCd in the temperature range 225-400°C in the as-cast state and in the temperature range 20-400°C in the homogenized state; the compound $MgCd_3$ in the temperature range 20-175°C. Analysis of the obtained data (Fig.1) shows that the Mg_3Cd and $MgCd_3$ compounds in the as-cast state show two contraction minima, one at the ordering temperature and the other slightly above that temperature; the plasticity increases on further increase in the temperature. For the compound MgCd in the as-cast state a contraction minimum was also observed at the

ordering temperature and a sharp increase in plasticity followed with a slight drop in plasticity at about 300°C. In testing homogenized specimens of the compound MgCd (Fig.2) the authors observed only a uniform increase of the contraction with temperature. Above 150°C the plasticity remained constant and no anomalies were observed in the contraction curve. However, the elongation determined in the same tests showed an appreciable maximum (up to 165%) at about 280°C within a very narrow range of temperatures slightly above the temperature of complete disordering (250°C). It is known that such unusual effects, referred to as "super-plasticity", are observed in the case of intensive diffusion during the stabilization of metastable specimens. Obviously, the process of establishing complete disorder during the heating is delayed somewhat and develops extensively in a narrow temperature range slightly above the point of order-disorder transition. The difference in the change in the plasticity of alloys with temperature in the as-cast and the homogenized states can be explained as follows: in as-cast alloys a certain degree of long-range order occurs which appears on the X-ray diffraction patterns in the form of super-structure lines;

on increasing the temperature the degree of ordering increases. The process of ordering has the highest speed at temperatures slightly below the order-disorder transition temperature, which also manifests itself by a maximum in the plasticity of the $MgCd_3$ compound at 75°C and the Mg_3Cd compound at 140°C and the $MgCd_3$ compound at 220°C. If the temperature increases further, the kinetics of the process of ordering becomes less intensive and the plasticity indices decrease accordingly. At higher temperatures the reverse process takes place, namely, disordering, which yields a maximum plasticity: at 140°C for $MgCd_3$, at 280°C for MgCd and at 200°C for Mg_3Cd. In investigating ordered specimens of MgCd the high degree of ordering leads to intensive disordering, even in the temperature range 100-150°C, as a result of which there will be an appreciable increase in the contraction; this process is most intensive at about 280°C and manifests itself by the effect of super-plasticity. Thus, experimental data on the plasticity of the compounds Mg_3Cd, MgCd and $MgCd_3$, formed by the process of ordering, indicates that their dissociation (disordering) on increasing the temperature is

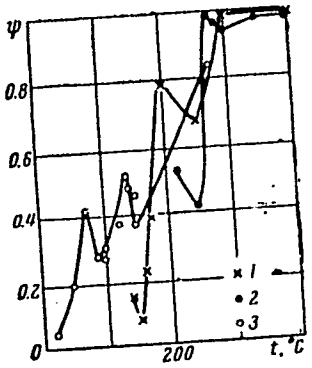
accompanied, firstly, by a considerable general increase in the plastic properties and, secondly, by an anomalous increase in plasticity at certain temperatures. There are 2 figures and 3 Soviet references.

[Abstractor's Note: Complete translation.]

SUBMITTED: January 24, 1961

Fig.1. Legend.

Temperature dependence of the plasticity in the as-cast state of the alloys Mg_3Cd (1), MgCd (2) and $MgCd_3$ (3).



S/137/62/000/003/114/191
A060/A101

AUTHOR: Presnyakov, A. A.

TITLE: On the temperature dependence of tensile strength

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 3, 1962, 17, abstract 3I107 ("Tr. In-ta yadern. fiz. AN KazSSR", 1961, 4, 107-110)

TEXT: An investigation was carried out upon the temperature dependence of the tensile strength S_p of commercially pure Zn. A functional dependence was established of S_p upon the temperature for Zn, containing four regions: 1) the brittle zone (20 - 75°C), 2) high ductility zone (75 - 180°C), 3) 2-nd brittleness zone (180 - 350°C), 4) 2-nd high-ductility zone (350 - 400°C). This variation in S_p is explained by the change in the ratio of S_p to the shearing strength τ_k : $S_p/\tau_k \geq 2$; when $S_p/\tau_k \leq 2$ the destruction is brittle, when $S_p/\tau_k \geq 2$ - viscous. There are 25 references.

P. Zubarev

[Abstracter's note: Complete translation]

Card 1/1

S/058/62/000/003/071/092
A061/A101

18 8250
24.7500

AUTHOR: Presnyakov, A. A.

TITLE: Diffusion mechanism of plasticity

PERIODICAL: Referativnyy zhurnal, Fizika, no. 3, 1962, 50, abstract 3E375 ("Tr. In-ta yadern. fiz., AN KazSSR", 1961, v. 4, 111 - 115)

TEXT: A diffusion mecnanism is proposed to explain the phenomena observed in the plastic deformation of metals and alloys. It is assumed that individual atomic chains are split in the inhomogeneous field of stresses of the deformed specimen, resulting in a vacancy as the atoms of the surrounding chains are displaced. The true mechanism of "diffusion" plasticity without hardening is possible only if the quantity of excess vacancies remains constant in the deformation process. In the contrary case, hardening sets in. The process of diffusion plasticity must be ensured by a sufficient atom mobility which depends on temperature. In solid solutions, some secondary diffusion processes may take place with deformation, and act upon plasticity by influencing atom mobility. It is stated that all currently known facts concerning the plastic deformation of metals and

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Diffusion mechanism of plasticity

S/058/62/000/003/071/092
A061/A101

alloys may be explained by the diffusion mechanism of plastic deformation.

Ye. Tomilovskiy

[Abstracter's note: Complete translation]

Card 2/2

S/137/62/000/003/145/191
A052/A101

AUTHORS: Vinnitskiy, A. A., Presnyakov, A. A.

TITLE: The experimental determination of the coefficient of friction at swaging

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 3, 1962, 75, abstract 3I483 ("Tr. In-ta yadern. fiz. AN KazSSR, no. 4, 1961, 116-121)

TEXT: The experiments on determining the coefficient of external fiction are described. They were carried out by means of a slitted striker, developed by the authors, as well as by the shear method suggested by I.M. Pavlov and P. S. Kostychev. Cylindrical samples 20 mm high and 16 mm in diameter made of annealed Cu, Л 80 (L80) and Л62 (L62) brass and argentan were used. To determine the extension of the adhesion zone special experiments were done: a number of circles was drawn on the contact surface and that part of it was determined which was not deformed. The results obtained are presented on diagrams in the form of dependences of the coefficient of external friction and the degree of deformation. The regularities in the changes of the coefficient of external friction, determined on both devices, practically coincide; at low degrees

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The experimental determination ...

of deformation (under 10%) the coefficients of external friction are very near to 0.5; at equal degrees of deformation the coefficients of external friction coincide for different alloys, and with the increase of the degree of deformation the coefficient of external friction decreases in all cases tending to a value lower than 0.1. At high rates of deformation the values of the coefficient of external friction are equal. In cases of maximum extension of the adhesion zone the coefficient of external friction has the highest value, consequently exactly to the adhesion zone correspond the highest coefficients of external friction. The authors maintain that their experiments have proved the existence of two kinds of friction: of the adhesion friction with the coefficient of external friction of $\sim$0.5 and of the sliding friction with the coefficient of external friction several times lower, and that the opinion of A. I. Tselikov and A. A. Korolev about the inconstancy of the coefficient of external friction and its relatively low value in the adhesion zone should be considered as an erroneous one. See RZhMet, 1961, 6I321. There are 15 references.

V. Ferenóts

[Abstracter's note: Complete translation]

Card 2/2

24639
S/031/61/000/005/002/002
B103/B215

18.7500

AUTHORS: Nysanbayev, G. N., Presnyakov, A. A., Candidate of Physics and Mathematics

TITLE: Effect of the rate of crystallization upon the properties of metallic solid solutions

PERIODICAL: Akademiya nauk Kazakhskoy SSR. Vestnik, 1961, no. 5 (194), 74 - 78

TEXT: The authors studied (Ref. 6: Trudy Instituta yadernoy fiziki, tom IV, 1961, in print) the effect of the rate of crystallization upon the dendritic structure in commercial-grade metals. The properties of casting metal are changed by accelerated crystallization, but the causes of this phenomenon are not always clear. Anomalies of plasticity often occur. This subject is therefore of scientific and practical interest. The present paper deals with the effect of the rate of crystallization upon homogeneous solid solutions, i. e., of aluminum bronze with an aluminum content of 1.02, 2.0, 3.0, 4.15, 4.91, 5.84, 7.17, 8.05, 8.90, and 9.7 %. Each alloy was either crystallized (1) very fast (cast on a massive copper plate), or (2) very slowly (in a furnace). The following

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structural differences were found between (1) and (2): (1) The grain size in specimens first increases with increasing Al concentration until the maximum is reached at ~ 3 % Al. At 7 % Al, a rapid structural refinement sets in. Between 4 and 7 %, the structure is typically dendritic, and is refined as the content of the alloying element increases. The $\alpha + \gamma$ eutectoid is never included. An oxide film sometimes causes certain phenomena on the ground surface. The authors found that high-alloy bronzes in case (1) were metastable. (2) Contrary to (1), the specimens of (2) have no microscopically visible dendritic heterogeneity. A large number of twins occurs (maximum at 7 % Al). The outward appearance of specimens is similar to that of deformed and annealed alloys. The second phase becomes visible at an Al content of 8.9 %. The lowest grain size was observed at 2.0 % Al, the highest at 5 - 6 % Al. Fast and slowly crystallizing alloys thus deviate considerably from the state of equilibrium and are, therefore, largely metastable. The microhardness of the alloys changes regularly despite a certain spread. Higher concentrations of the alloys increase the microhardness in (1) and (2), also after deformation and subsequent annealing. The specimens of (1), however, are always softer than those of (2). The differences vary

between 35 units (at 1.02 % al) and 65 units (at 9.7 % Al). With an Al content of approximately 1 %, the microhardness decreases probably due to the oxidizing effect of Al. The microhardnesses of (1) and (2) are practically equal after deformation and annealing. The index of microhardness increases if the specimens of (1) are equilibrated. It is known that the spread of the microhardness is an index of the formation of microheterogeneity. It was lowest in specimens of (1). This is in agreement with the published data, according to which the separating diffusion is suppressed in fast crystallization. The spread of microhardness rapidly increases if the specimens of (1) are equilibrated by deformation and annealing. As far as the authors know, this has never been stated in publications. They assume this phenomenon to be due to a heterogeneity in the state of equilibrium. Apparently, is has nothing to do with the heterogeneities II and III (Bochvar A. A., Zhadayeva O. S., Ref. 9: "Izvestiya AN SSSR", OTN, 1945, no. 9; Kasymbekova K. K., Presnyakov A. A. O prichinakh mikroneodnorodnostey tverdykh rastvorov (Causes of microheterogeneities of solid solutions) Metallovedeniye i termicheskaya obrabotka metallov (in print)). The lattice constants are smallest immediately after hardening, somewhat larger after deformation

and annealing, and largest in case (2). These changes of the constants are caused by different degrees of saturation of solid Al solutions in Cu with admixtures, and by larger or smaller thermal stresses. Hence the relation between the metastability of Cu-Al alloys in fast crystallization and certain distortions in the crystal lattice. At the laboratory of the authors, Yu. A. Gorban', Engineer, was the first to find that the lattice constant was anomalously changed for unknown reasons at 3 - 4 % Al. Finally, the authors state that in solid solutions of Al in Cu (like in commercial-grade metals) a metastable state occurs in fast crystallization which shows low dendritic heterogeneity, low grain hardness, and a smaller lattice constant. The lower microhardness of the solid solution is explained by the course of stabilization in the determination of microhardness. The authors assume that the stabilization after fast crystallization may take place more or less intensively also in the case of several other nonferrous metal alloys. This may cause various deviations in casting and also in the treatment under pressure. The mechanism of development of high metastability in fast crystallization and the stabilization kinetics therefore require further studies. Papers by I. I. Novikov are mentioned. There are 3 figures and 10 Soviet-bloc references.

Card 4/4

S/129/61/000/007/005/016
E073/E535

18 1210

Authors: Kasymbekova, K.N. and Presnyakov, A.A.

Title: Causes of concentration non-uniformities in solid solutions

Periodical: Metallovedeniye i termicheskaya obrabotka metallov, 1961, No 7, pp 20-22

Abstract: In earlier work of the authors relating to X-ray structural investigations of coarse grain brasses, a considerable scatter in the lattice parameter was observed. Analogous phenomena were observed on studying aluminium bronzes, aluminium-copper and aluminium-zinc alloys. In all cases the scatter of the parameter increased sharply near the line of phase transformations (Fig.1). In this paper the authors investigated a number of alloys of the Cu-Ni system by the method of micro-hardness and by X-ray analysis. It was found that the concentration non-uniformity of the alloys belonging to the continuous series of solid solutions is associated with their concentration and increases with increasing concentration. The concentration

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Causes of concentration

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non-uniformity is particularly pronounced in the case of long duration annealing and quenching (1000°C, 10 hours). Slow cooling after annealing leads to a decrease in the non-uniformities. The highest non-uniformity in the microhardness as well as in the lattice parameter was observed on quenching from temperatures which are near to the solidus temperature (Fig.2). If the annealing temperatures are not high enough, the non-uniformities of alloys with various nickel contents remain unchanged. The results have shown the following:

1. Concentration non-uniformities in solid solutions can be observed also in alloys belonging to the continuous series of solid solutions where there is no possibility of formation of particles of the second phase in the interdendrite spaces.
2. The non-uniformity depends on the composition of the alloy, increasing with increasing degree of alloying.
3. The non-uniformity increases with increasing annealing temperature.

Thus, the non-uniformity has nothing to do with dendritic liquation but is due to a stable enrichment of individual areas with one of

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the components of the alloy at elevated temperatures. Such a phenomenon is referred to as type III heterogeneity. The following conclusions are arrived at:
1. In solid solutions considerable discrete concentration non-uniformities are observed which prepare phase transformations in temperature ranges which are sufficiently distant from the line of equilibrium of the diagram of state.
2. The cause of occurrence of such type III heterogeneity is the diffusion which precedes the reconstruction of a crystal lattice at temperatures and concentrations at which phase transformations occur. There are 2 figures and 8 Soviet references.

ASSOCIATION: Institut yadernoy fiziki AN Kazakhskoy SSR (Institute of Nuclear Physics Kazakh SSR)

Causes of concentration ...

S/129/61/000/007/005/016
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Fig.1. Legend.

Dependence of the magnitude of the parameter calculated along the individual spots of the line (420) on the zinc content for α-brass (200°C)

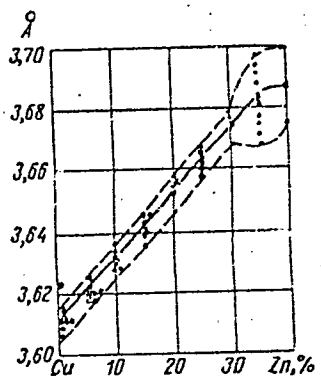
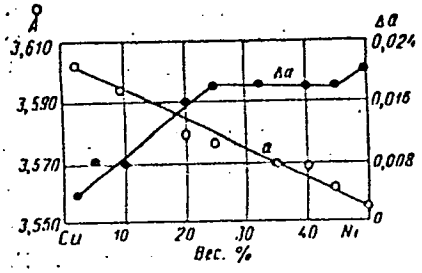


Fig.2. Legend.

Values of the parameter a and the scatter △a as a function of the nickel content (wt.%) in alloys of the Cu-Ni system.



Card 4/4

S/126/61/012/006/011/023
E193/E383

AUTHORS: Presnyakov, A.A. and Starikova, G.V.

TITLE: On the nature of anomalous plasticity of two-phase brasses

PERIODICAL: Fizika metallov i metallovedeniye, v.12, no. 6, 1961, 873 - 878

TEXT: In continuation of their earlier work (Ref. 3: Izv. AN SSSR, OTN, Metallurgiya i toplivo, no. 1, 1960) the present authors studied the relationship between plasticity of brasses Л56 (L56) (α+β-brass), L52 and L51.5 (β-brass) and 150 (β+γ-brass), on the one hand, and phase transformations taking place in these alloys, on the other. To this end the elongation of tensile specimens tested at various temperatures and at a strain rate of 10 mm/min was measured, and the temperature-dependence of the electrical resistance of L52 and L50 and lattice parameter of L52 was determined. The results are reproduced graphically. In Fig. 1, elongation (δ, %) of alloys indicated by each curve is plotted against the test temperature (°C).

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On the nature of ....

In Fig. 3, the electrical resistivity ($\rho \times 10^6$ ohm cm) of L52 (lefthand scale) and L50 (righthand scale) is plotted against the temperature (^{o}C). Finally, in Fig. 4, the lattice parameter (kX) of the β-phase containing 52% Cu is plotted against temperature (^{o}C). Analysis of the experimental results correlated with the constitution diagram of the Cu-Zn system led the present authors to the conclusion that the anomalous increase in plasticity of brasses on heating is associated with the increasing proportion of the β-phase, which is very plastic at elevated temperatures. The existence of an intermediate β_H-phase was postulated and it was suggested that the transformation of the β'-phase, stable below 460 ^{o}C, took place according to:

$$\beta' \rightarrow \beta_H \rightarrow (\alpha + \beta) \rightarrow \beta .$$

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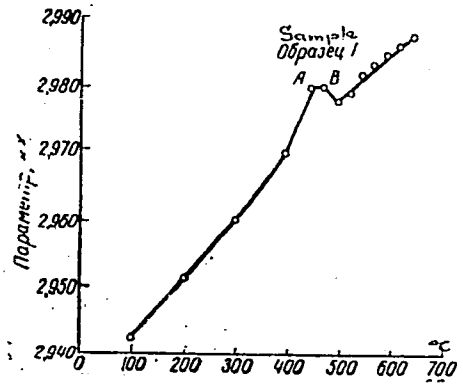
On the nature of ....

S/126/61/012/006/011/023
E193/E383

There are 4 figures and 18 references: 9 Soviet-bloc and 9 non-Soviet-bloc. The two English-language references quoted are: Ref. 15: C.H. Carpenter, Journ. Inst. of Metals, 1912, 8, 51; Ref. 17: C.H. Carpenter, Journ. Inst. of Metals, 1912, 8, 59.

SUBMITTED: August 15, 1960 (initially)
May 5, 1961 (after revision)

Fig. 4:



Card 3/3

NYSANBAYEV, G.N.; PRESNYAKOV, A.A., kand.fiziko-matematicheskik nauk

Effect of crystallization rate on the properties of metallic solid solutions. Vest.AN Kazakh.SSR 17 no.5:74-78 My '61.
(MIRA 14:6)

(Crystallization) (Alloys)

PRESNYAKOV, A.A.; Prinimal uchastiye: GORBAN', Yu.A.

Determination of crystal lattice parameters on the ray patterns of macrocrystalline specimens. Zav.lab. 27 no.6:689-691 '61. (MIRA 14:6)

1. Institut yadernoy fiziki Akademii nauk KazSSR.
(Crystal lattices) (Radiograph)

PRESNYAKOV, A.A.; GORBAN', Yu.A.; CHERVYAKOVA, V.V. (Alma-Ata)

Phase diagram Al - Zn. Zhur.fiz.khim. 35 no.6:1289-1291 Je '61.
(MIRA 14:7)

(Aluminum-zinc alloys)

MIRONENKO, Yuriy Petrovich; PRESNYAKOV, Aleksandr Aleksandrovich; GRINMAN, I.G., kand. fiziko-matem. nauk, otv. red.; RZHONDKOVSKAYA, L.S., red.; ALFEROVA, P.F., tekhn. red.

[Resistance to deformation of heavy nonferrous alloys] Soprotivlenie deformirovaniiu tiazhelykh tsvetnykh splavov. Alma-Ata, Izd-vo Akad. nauk Kazakhskoi SSR, 1962. 129 p. (MIRA 15:3)

(Nonferrous alloys) (Deformations (Mechanics))

PHASE I BOOK EXPLOITATION SOV/6053

Presnyakov, Aleksandr Aleksandrovich

Fizika protsessa prokatki (Physics of the Rolling Process) Alma-Ata, Izd-vo AN KazSSR, 1962. 192 p. 1800 copies printed.

Sponsoring Agency: Akademiya nauk Kazakhskoy SSR. Institut metallurgii i obogashcheniya.

Resp. Ed.: I. G. Grinman; Eds.: L. S. Rzhondkovskaya, and Yu. N. Kuznetsov; Tech. Ed.: A. G. Khudyakov.

PURPOSE: This book is intended for engineering personnel in the metallurgical industry and for scientific research workers. It may also be useful to aspirants and students specializing in the pressure working of metals.

COVERAGE: The book presents an analysis of experimental materials relating to metal deformation during rolling. On the basis of this analysis the author comes to the conclusion that there is

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Physics of the (Cont.) SOV/6053

a considerable nonuniformity in the distribution of deformation. Recent experimental findings on external friction and the structure of the deformation zone are discussed. No personalities are mentioned. There are 139 references, mostly Soviet.

TABLE OF CONTENTS:

AVAILABLE: Library of Congress

SUBJECT: Metals and Metallurgy
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DV/wrc/ldc
10/23/62

S/136/62/000/001/004/005
E082/E435

AUTHORS: Presnyakov, A.A., Chervyakova, V.V., Novikov, A.V., Basina, A.N.

TITLE: About the possibility of hot rolling brass ЛС 63-1 (LS63-1)

PERIODICAL: Tsvetnyye metally, No.1, 1962, 78-80

TEXT: The article records experiments to develop brass, suitable for hot rolling at high temperature, also tests made to determine the effects of temperature and rate of cooling on the ductility of the alloy. Micro-analyses were made to study changes in the structure of the metal and the influence of small quantities of silicon. An alloy of 62.5% Cu, 1.36% Pb and 0.3% Si had good plasticity at temperatures up to 700/800°C. There are 3 figures and 4 references: 3 Soviet-bloc and 1 non-Soviet-bloc.

Card 1/1

KLYUCHNIKOV, Yu.F.; PRESNYAKOV, A.A.

Changes in the electrical resistance of brasses close to the stoichiometric composition of Cu_3Zn during various heat treatments. Trudy Inst. met. i obogashch. AN Kazakh. SSR 4:82-86 '62. (MIRA 15:8)

(brass--Electric properties)
(Metals, Effect of temperature on)

S/030/62/000/007/003/004
I048/I248

AUTHOR: Presnyakov, A.A.

TITLE: A study of anomalies in the plasticity of metallic alloys

PERIODICAL: Akademii Nauk SSSR, Vestnik. no. 7, 1962, 60-63

TEXT: At the Physico-technical Institute of the Academy of Sciences of the Kazakhstan SSR. copper, aluminum, zinc and magnesium-based alloys were studied, to determine the effect of composition, temperature, and state of the alloy on the anomalies in their plastic behavior. Changes in certain physical properties of the alloy, such as electric conductivity, microhardness, etc., were also investigated. The anomalies are associated with the

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A study of anomalies...

state of the crystalline lattice of the alloys, and localized "dips" in plasticity were observed in almost all cases of trans-crystalline failure. The decrease in plasticity is proportional to the amount of foreign atoms in the crystalline lattice. The "dips" appear when the rate of stabilization processes is lower than that of deformation processes. They are associated with recrystallization and ordering in brass, Cu-Ni alloys, and Al bronzes, with aging and recrystallization in tin bronzes, and with aging, recrystallization and dissolution of the second-phase particles in Al-Cu and Al-Zn alloys. The occurence of diffusive stabilization processes causes distortions, which, together with the deformation-caused distortions, lead to a considerable decrease in plasticity. Superplasticity is observed in cases in which stabilization processes are very rapid e.g., in eutectic Al-Zn

A study of anomalies....

alloys, as well as in some metastable cast alloys of eutectic composition. In the case of simple and lead-containing $\alpha + \beta$ brasses, the increase in plasticity is associated with the $\alpha \rightarrow \beta$ phase transition, i.e., with the metastability of the alloy within a certain temperature range. Part of the above experimental results were used successfully to increase the plasticity of technical alloys manufactured at the Balkhash non-ferrous alloys plant.

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STARIKOVA, G.V.; PRESNYAKOV, A.A.

Investigating the electrical resistance of the Al-Zn eutectoid. Trudy Inst. met. i obog. AN Kazakh. SSR 5:175-178 '62. (MIRA 15:11)
(Aluminum-zinc alloys--Electric properties)

PRESNYAKOV, A.A.; DAUTOVA, L.I.

Certain characteristics of the ordering process of the copper-gold solid solution close to the Cu_3Au composition. Trudy Inst. met. i obog. AN Kazakh. SSR 5:179-183 '62. (MIRA 15:11)

(Copper-gold alloys—Metallography)
(Crystal lattices)

PRESNYAKOV, A.A.; STARIKOVA, G.V.

Experimental study of the kinetic correspondence in the development of superplasticity in metastable eutectics. Trudy Inst. met. i obog. AN Kazakh. SSR 5:184-185 '62. (MIRA 15:11)

(Eutectics) (Plasticity)

PRESNYAKOV, A.A.

Use of torquemeters and built-in spot dynamometers for the testing of rolls. Trudy Inst. met. i obog. AN Kazakh. SSR 5:186-190 '62. (MIRA 15:11)
(Rolls (Iron mills)—Testing)
(Deformations (Mechanics))

S/126/62/013/005/021/031
E202/E492

AUTHORS: Starikova, G.V., Presnyakov, A.A.

TITLE: Evaluation of metastable casting eutectics in connection with the phenomenon of "superplasticity"

PERIODICAL: Fizika metallov i metallovedeniye, v.13, no.5, 1962, 769-771

TEXT: Superplasticity was observed earlier in casting eutectics of the Pb-Sn and Mg-Cu system (Izv. AN SSSR, OTN, no.1, 1961) and it was attributed chiefly to the concentration of nonequilibrium in the eutectic alloy obtained during quick cooling. The authors studied the degree of nonequilibrium in terms of the minimum relative amount of atoms, the transfer of which may revert the alloy to the state of full stability. Making a number of assumptions concerning the statistical distribution of components and dividing the alloy into two zones viz. first type in which the decomposition of the alloy leads to the formation of α-phase grains and the second type which produces grains of β-phase, the authors arrive at an expression for the total relative number of atoms diffusing through the boundaries of the above zones.
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Evaluation of metastable ...

The latter expression shows that the highest degree of nonequilibrium ($\eta = 0.5$) occurs when the content of the second component in the eutectic is 50% and the solubility in the α- and β-phases with respect to both components is very small. The increase in η does not always correspond to the actually attained nonequilibrium there being also other factors causing the superplasticity which are not fully discussed. Altogether 22 systems are listed in the order of the ascending η. These eutectics are divided further into three groups: 1st - with $\eta < 0.11$ in which there is no superplasticity; 2nd - with $\eta = 0.11$ to 0.24 which shows increased plasticity and sporadic superplasticity and 3rd group with $\eta > 0.24$, which is considerably different structurally and cannot be satisfactorily explained in terms of η alone. There is 1 table.

ASSOCIATION: Institut metallurgii i obogashcheniya AN Kaz.SSR
(Institute of Metallurgy and Ore Enrichment AS Kaz.SSR)

SUBMITTED: April 3, 1961 (initially)
November 27, 1961 (after revision)

Card 2/2

PRESNYAKOV, A.A.; DAUTOVA, L.I.

Certain peculiarities of the recrystallization of ordered alloys. Fiz. met. i metalloved. 14 no.3:461-462 S '62. (MIRA 15:9)

1. Institut metallurgii i obogashcheniya AN KazSSR.
(Alloys--Metallography) (Crystallization)

PRESNYAKOV, A.A.; CHERVYAKOVA, V.V.; NOVIKOV, A.V.; BASINA, A.N.

Possibility of hot rolling LS63-1 brass. TSvet. met. 35 no.1: 78-80 Ja '62. (MIRA 16:7)
(Rolling (Metalwork)) (Brass)

PRESNYAKOV, A.A.; CHERVYAKOVA, V.V.; NOVIKOV, A.V.; FRIDMAN, L.P.

Optimum procedure for the hot working of LS59-1 brass. TSvet. met. 35 no.8:82-83 Ag '62. (MIRA 15:8)
(Brass) (Rolling (Metalwork))

PRESNYAKOV, A. A.,

"The beneficial effect of Ce on the ductility of brass,"

report presented at the Conf. on New Trends in the Study and Applications of Rare Earth Metals, Moscow, 18-20 Mar 63

PRESNYAKOV, Aleksandr Aleksandrovich; GRINMAN, I.G., otv. red.; GLAZYRINA, D.M., red.; KHUDYAKOV, A.G., tekhn. red.

[Physical nature of plasticity anomalies in metal alloys] Fizicheskaia priroda anomalii plastichnosti u metallicheskikh splavov. Otv. red. I.G.Grinman. Alma-Ata, Izd-vo Akad.nauk Kazakhskoi SSR, 1963. 63 p. (MIRA 16:4)
(Nonferrous alloys--Testing) (Plasticity)

PHASE I BOOK EXPLOITATION SOV/6504

Presnyakov, Aleksandr Aleksandrovich

Fizicheskaya prioroda anomaliy plastichnosti u metallicheskikh splavov (Physical Nature of Anomalies in Ductility of Metal Alloys) Alma-Ata, Izd-vo AN KazSSR, 1963. 63 p. 1100 copies printed.

SPONSORING AGENCY: Akademiya nauk Kazakhskoy SSR. Institut metallurgii i obogashcheniya.

Resp. Ed.: I. G. Grinman, Ed.: D. M. Glazyrina; Tech. Ed.: A. G. Khudyakov.

PURPOSE: This booklet is intended for engineering personnel of nonferrous metal-working plants, scientific research workers, and students concerned with problems of metal science.

COVERAGE: This booklet explains the concepts of the diffusion nature of ductility drop and superductility on the basis of investigations of ductility anomalies in brass, bronze, and aluminum alloys. No personalities are mentioned. There are 62 references: 46 Soviet, 9 German, and 7 English.

Card 1/2

PRESNYAKOV, A.A. (Alma-Ata); STARKOVA, G.V. (Alma-Ata)

Kinetic correspondence between transformations and deformations in the formation of superplasticity. Izv. AN SSSR. Otd. tekh. nauk. Met. i gor. delo no.4:127-129 Jl-Ag '63. (MIRA 16:10)

PRESNYAKOV, A.A.; DAUTOVA, L.I.; SAMOYLOV, V.A.; AYTKHOZHIN, E.S.

Causes of structural anomalies and the properties of zinc.
Trudy Inst. met. i obog. AN Kazakh. SSR 7:3-16 '63.
(MIRA 17:6)

DZHANBUSINOV, Ye.A.; DAUTOVA, L.I.; PRESNYAKOV, A.A.

Ordering of copper-palladium alloys in the neighborhood of the Cu_3Pd composition. Trudy Inst. met. i obog. AN Kazakh. SSR 7:24-29 '63. (MIRA 17:6)

KASYMBEKOVA, K.K.; MELIKHOV, V.D.; PRESNYAKOV, A.A.

Changes in the structure of magnesium-cadmium alloys during ordering. Trudy Inst. met. i obog. AN Kazakh. SSR 7:30-35 '63. (MIRA 17:6)

DAUTOVA, L.I.; PRESNYAKOV, A.A.

Certain characteristics of the recrystallization of ordered alloys. Trudy Inst. met. i obog. AN Kazakh. SSR 7:36-37 '62.

Metastability of superlattices. Ibid.:89-91

(MIRA 17:6)

KLYUCHNIKOV, Yu.F.; PRESNYAKOV, A.A.

Effect of the rate of deformation on the plasticity indices of alloys in the Cu_3Zn range. Trudy Inst. met. i obog. AN Kazakh. SSR 7:76-79 '63. (MIRA 17:6)

PRESNYAKOV, A.A.

Elements of the theory of the superplasticity phenomenon. Trudy Inst. met. i obog. AN Kazakh. SSR 7:43-55 '63.

Effect of plastic deformation on the ordering of alloys. Trudy Inst. met. i obog. AN Kazakh. SSR 7:92-9[illegible]

Special characteristics of plastic friction. Trudy Inst. met. i obog. AN Kazakh. SSR 7:134-13[illegible] (MIRA 17:6)

PYESNYAKOV, A.A.; STARIKOVA, G.V.

Experimental study of the kinetic congruence between transformation and deformation during the emergence of superplasticity. Trudy Inst. met. i obog. AN Kazakh. SSR 7:56-60 '63.

Experimental proof of the "recrystallization by deformation" phenomenon. Ibid.:61-69 (MIRA 17:6)

NYSANBAYEV, G.N.; PRESNYAKOV, A.A.; CHERVYAKOVA, V.V.

Aging of lead α-brass. Trudy Inst. met. i obog. AN Kazakh. SSR 7:84-88 '63. (MIRA 17:6)

NOVIKOV, A.V.; PRESNYAKOV, A.A.; CHERVYAKOVA, V.V.

Investigating the aging process in LS64-2 alloys containing silicon by the microhardness method. Trudy Inst. met. i obog. AN Kazakh. SSR 7:96-100 '63. (MIRA 17:6)

VINNITSKIY, A.A.; PRESNYAKOV, A.A.

Characteristics of friction during rolling. Trudy Inst. met. i obog. AN Kazakh. SSR 7:122-133 '63. (MIRA 17:6)

S/279/63/000/001/013/023
E075/E452

AUTHORS: Presnyakov, A.A., Dautova, L.I., Aytkhozhin, E.S. (Alma-Ata)

TITLE: On the problem of the nature of the rheotropic brittleness

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Metallurgiya i gornoye delo. no.1, 1963, 142-143

TEXT: If a cold brittle metal is deformed plastically in the absence of recrystallization, then the brittle state transition temperature decreases and the plasticity at room temperature increases. This phenomenon was called rheotropic brittleness. The authors investigated the nature of this phenomenon on zinc of a high purity (99.998%). The plasticity was determined by 180° bending, using strip specimens 0.5 mm thick and 5.75 mm wide, the determinations being made immediately after cutting, after 6 months storing and after heat treatment at temperatures 50, 75, 100 etc (in 25°C intervals) up to 400°C in air for one hour. In addition, electrical conductivity measurements and X-ray

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On the problem of the nature ... S/279/63/000/001/013/023
E075/E452

photographs were taken after each heat treatment. The results obtained showed that generally accepted views on the rheotropic brittleness do not hold in the case of zinc; on the contrary, it was shown that high plasticity can be obtained by deformation above the recrystallization temperature. This plasticity is retained to some extent after the recrystallization is completed. It is thought that the views on the appearance of the rheotropic brittleness after deformation below the recrystallization temperature were due to the fact that previous investigations were carried out on metals with high recrystallization temperatures. There are 3 figures.

SUBMITTED: February 17, 1962

Card 2/2

PRESNAYKOV, A.A. (Alma-Ata); DAUTOVA, L.I. (Alma-Ata); AYTKHOZHIN, E.S. (Alma-Ata)

Nature of rheotropic recovery. Izv. AN SSSR. Otd. tekh. nauk. Met. i gor. delo n.1:142-143 Ja-F '63. (MIRA 16:3)
(Zinc—Brittleness) (Metals, Effect of temperature on)

KLYUCHNIKOV, Yu.F.; PRESNYAKOV, A.A.

Plasticity of copper-zinc alloys. Trudy Inst. met. i obog. AN Kazakh. SSR 8:147-157 '63 (MIRA 17:8)

X-ray investigation of the effect of zinc concentration on the ordering of α-brass. Ibid.:158-164

PRESNYAKOV, A.A.; VINNITSKIY, A.A.

Theory of a split roller intended for measuring friction forces during rolling. Izv. vys. ucheb. zav.; chern. met. 6 no.3: 113-116 '63. (MIRA 16:5)

1. Institut yadernoy fiziki AN KazSSR.
(Rolling (Metalwork)) (Friction—Measurement)

S/126/63/015/001/019/029
E073/E151

AUTHORS: Kasymbekova, K.K., and Presnyakov, A.A.

TITLE: Physical properties of γ-phase Cu-Zn

PERIODICAL: Fizika metallov i metallovedeniye, v.15, no.1, 1963, 134-137

TEXT: Published information on the γ-phase is scanty. Specimens were prepared by casting and by hot-pressing at 700 °C, with a load of 30 tons giving 80% reduction, using alloy made from 99.997% purity Cu and 99.99% purity Zn, either under air or under argon. Deformation of the hot-pressings was carried out by bending through a large angle over a small radius. This was readily carried out shortly after removal from the mould, but if allowed to cool by 20-60° before testing the specimens became extremely brittle. The brittle-ductile transition temperature was found to be 650-670 °C. Equilibrium was achieved by annealing the hot-pressed specimens for 90 hours, made up of 2 hours at 750°, 4 hours at 650°, 12 hours at 500°, 12 hours at 400°, 20 hours at 300°, 20 hours at 200°, 20 hours at 100°. Determinations were made of the hot hardness, and microhardness after quenching, and bend ductility, and the

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Physical properties of γ-phase Cu-Zn S/126/63/015/001/019/029
E073/E151

structure of the fracture was analysed. Conclusions. Several transformations were observed over a wide temperature range, confirming previous data on transformations at 280 and 500°, and revealing a new transformation at 700°. This transformation influences the γ-phase, leading to a fall in ductility similar to that in solid solutions. Further work is required to clarify the transformations in the γ-phase. Ductility does not increase uniformly with temperature; there is transition to brittleness at 600-650° in cast specimens and at 500-600° in equilibrium annealed. In both cases there was an increase to maximum ductility at 700°, followed by a sudden fall to zero at 725° and 750° respectively. At still higher temperatures ductility increased uniformly. γ-phase Cu-Zn can be deformed by hot-pressing in a closed die. There are 3 figures and 1 table.

ASSOCIATION: Institut metallurgii i obogashcheniya AN Kaz SSR
(Institute of Metallurgy and Beneficiation,
Card 2/2 AS Kaz.SSR)

SUBMITTED: May 21, 1962

L 19495-63 EWP(q)/EWT(m)/EWP(B)/BDS AFFTC/ASD JD
ACCESSION NR: AP3004592 S/0126/63/016/001/0061/0064

AUTHORS: Presnyakov, A. A.; Dautova, L. I.; Dzhanbusinov, Ye. A.

TITLE: Structural forms of solid Cu-Pd solution with the approximate composition Cu_3Pd

SOURCE: Fizika metallov i metallovedeniye, v. 16, no. 1, 1963, 61-64

TOPIC TAGS: Cu-Pd alloy, structure, Cu_3Pd

ABSTRACT: Cu alloys with 28.8 at.% of Pd have been studied in order to clarify the details of the ordering process. The cast alloy was subjected to x-ray analysis at temperatures up to 400C. A higher heating was impossible because of the lack of proper equipment. The cast samples were rolled (80% deformation), hardened, and tempered at increasing temperatures (100 to 750C). The lattice parameter increased linearly with the increase in temperature up to 350C, after which it remained constant. This was explained by the phase transition and sustained by the appearance of a new line on the x-ray pattern at 375C. The structure of the new phase (X) could not be detected because of lack of data. The

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L 19495-63
ACCESSION NR: AP3004592

samples (after deformation and hardening at 750C) were in a disordered state. The lattice parameters were correspondingly, 3.697_3 and 3.6856 kX. Tempering at the increased temperatures resulted in the following space lattices: 1) initial condition--cubic face centered lattice; 2) heating to 350C--the same; 3) to 375C--ordered cubic face centered (superlattice); 4) 475-650C--tetragonal face centered lattice; 5) 675-700C--the phase X (structure unknown); 6) 700C and higher--disordered cubic face centered lattice. The authors conclude that the appearance of the superlattice marks the first stage in the solid solution ordering. The final stage leads to the formation of a new crystalline lattice. This is due to the appearance of additional binding forces between atoms in the alloy. The superlattice and the intermediate phases are metastable transition forms. Orig. art. has: 1 table and 3 figures.

ASSOCIATION: Institut metallurgii iobogashcheniya AN KazSSR (Metallurgical Institute, Academy of Sciences, Kazakh SSR)

SUBMITTED: 22May62	DATE ACQ: 27Aug63	ENCL: 00
SUB CODE: ML	NO REF SOV: 005	OTHER: 005

Card 2/2

MELIKHOV, V.D.; KASYMBEKOVA, K.K.; POLYAKOVA, T.P.; PRESNYAKOV, A.A.

Transformation in -brass. Fiz. met. i metalloved. 16 no.5:700-702 N '63. (MIRA 17:2)

1. Institut metallurgii obogashcheniya AN KazSSR.

NYSANBAYEV, G.N.; PRESNYAKOV, A.A.; CHERVYAKOVA, V.V.

Aging of lead -brass. TSvet. met. 36 no.10:69-73 O '63.
(MIRA 16:12)

GRINMAN Isaak Grigor'yevich. Prinimali uchastiye: SAKBAYEV, Zh.M.; BLYAKH, G.I.; SHAGI-SULTAN, I.Z.; SIRAZUTDINOVA, Zh.A.; SHTEYN, N.S.; YERMAGAMBETOV, S.B.; KOZLOV, G.S.[deceased]; IVANOV, L.G.; OSHCHENSKIY, V.M.; DZHASYBEKOVA, E.K.; NURGALIYEVA, Kh. PRESNYAKOV, A.A., doktor tekhn. nauk, otv. red.; ALEKSANDRIYSKIY, V.V., red.

[Automation of nonferrous metal ore dressing processes] Avtomatizatsiia protsessov obogashcheniia rud tsvetnykh metallov. Alma-Ata, Izd-vo AN Kaz.SSR, 1964. 213 p. (MIRA 17:10)

1. Laboratoriya elektroniki i avtomatiki Instituta yadernoy fiziki AN Kaz.SSR (fo all except Grinman, Presnyakov, Aleksandriyskiy).

L 45806-65 EWI(m)/EWP(w)/EWA(d)/EPR/T/EWP(t)/EWP(k)/EWP(z)/EWP(b)/EWA(c) Pf-4/
Pad/Ps-4 IJP(c) JD/WW

ACCESSION NR AM4046713 BOOK EXPLOITATION 5/ 46 B+1

Presnyakov, Aleksandr Aleksandrovich; Samoylov, Vladimir Anatol'yevich; Chervyakova, Valeriya Venediktovna

Plasticity of commercial alloys; reference materials (Plastichnost' tekhnicheskikh splavov; spravochnyye materialy), Alma-Ata, Izd-vo AN KazSSR, 1964, 216 p. illus., biblio. 2,000 copies printed. (At head of title: Akademiya nauk Kazakhskoy SSR. Institut metallurgii i obogashcheniya)

TOPIC TAGS: pressure working, iron alloy, copper alloy, aluminum alloy, zinc alloy, nickel alloy, magnesium alloy, titanium alloy, tin alloy, brass, bronze, lead alloy

PURPOSE AND COVERAGE: This manual contains systematized data on the plasticity of the most widely used commercial alloys based on iron, copper, aluminum, zinc, and other metals. It presents materials on the basic feature of workability in relation to temperature, composition, and phase of the alloys. The manual also contains the information necessary to develope more rational processes of metal pressure working and is intended as a practical guide for plant engineers. The book will also be useful for researchers and students who specialized in this area.

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L 45806-65
ACCESSION NR AM4046713

TABLE OF CONTENTS [abridged]:

SUB CODE: MM SUBMITTED: 03Jan64 NR REF SOV: 075

OTHER: 021 DATE ACQ: 25Jun64

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PRESNYAKOV, Aleksandr Aleksandrovich; SAMOYLOV, Vladimir Anatol'yevich; CHERVYAKOVA, Valeriya Venediktovna; GRINMAN, I.G., otv. red.; SHEVCHUK, T.I., red.

[Plasticity of commercial-grade alloys; reference materials] Plastichnost' tekhnicheskikh splavov; spravochnye materialy. Alma-Ata, Izd-vo AN Kaz.SSR, 1964. 219 p. (MIRA 17:6)

ACCESSION NR: AP4029708 S/0136/64/000/004/0073/0074

AUTHORS: Novikov, A.V.; Chervyakova, V.V.; Presnyakov, A.A.

TITLE: Plasticity of LS59-1-Type Brass at High Temperatures

SOURCE: Tsvetny*ye metally*, no. 4, 1964, 73-74

TOPIC TAGS: brass, plasticity, elongation, area reduction, deformation, micro structure, zinc, lead, nickel, alloy

ABSTRACT: The investigation of "LS59-1" brass specimens showed that after deformation and annealing, the plasticity of a cast alloy always increases resulting in a general expansion of the temperature range of deformability. Specimens contained 57.3% Cu; 0.9% Pb; 0.45% Ni; 0.18% Si; 0.22% Mn and Zn. Electrolytic "MO'type copper, "TsB" type zinc and "C1" type lead were used as charge materials in a low-frequency induction furnace. An alloy specimen annealed after cold deformation showed a considerable increase in performance figures at 500-600C and a sharp drop in elongation within the 700 to 800C temperature range. Microanalysis showed that deformation and annealing affect the decomposition of solid solutions and that a

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ACCESSION NR: AP4029708

new phase -- an intermetallic compound - forms from the additives and lead. Lead extraction and the formation of a new finely dispersed phase which is uniformly distributed in the alloy enhances the plasticity of $\alpha+\beta$ brass at 500 to 600C. At 700-800C plasticity depends upon the intensity of diffusion processes. Evidently, in an alloy submitted to cold deformation which has a great reserve of free energy, the diffusion processes occur with a higher intensity in comparison to processes in annealed alloys. That accounts for the increased plasticity within the 700 to 850C range observed during the extension of metal submitted to cold deformation. Changes in the initial state of the alloy affects the transformation processes and may result in different changes of plasticity within the temperature range of hot deformation. The orig. art. has: 2 figures.

ASSOCIATION: None

SUBMITTED: 00 DATE ACQ: 30Apr64 ENCL: 00

SUB CODE: ML NR REF SOV: 005 OTHER: 001

Card 2/2

ACCESSION NR: AP4040686 S/0129/64/000/006/0009/0011

TITLE: Changes in the structure of Mg-Cd alloys in the ordered state

AUTHOR: Kasy*mbekova, K. K.; Melikhov, V. D.; Presnyakov, A. A.

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 6, 1964, 9-11

TOPIC TAGS: ordered state, Mg Cd alloy, plasticity, microhardness, alloy structure

ABSTRACT: So far, there has not been any data available concerned with the effect of the ordered state on plasticity and strength of Mg_2Cd, MgCd and $MgCd_3$ alloys. In earlier work, the authors discovered the anomalous effects that occur in the changes of plastic properties of alloys in a near-ordered state. In Mg-Cd specimens having a stoichoimetric composition, plasticity rose sharply. Now, the authors attempt to verify earlier investigations by submitting cast Mg-Cd specimens in an ordered state to hardening at different temperatures. X-ray examinations showed that the heat-treated specimens subjected to tensile tests consist of a rhombic and a matastable phase. The ordered rhombic phase has the following

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ACCESSION NR: AP4040686

parameters: a = 4,993 kX; b = 3,216 kX and c = 5,256 kKh and the intermediary metastable phase has a = 6,072 kKh; c = 10.018 kX and c/a = 1,65. Maximum microhardness and the greatest changes in lattice parameters were observed at 250C. At this temperature, deformation releases an intensified order-disorder diffusion process that results in high plasticity provided the transformation and deformation processes stand in a favorable kinetic relationship. The orig. art. has: 2 figures.

ASSOCIATION: Institut metallurgii i obogashcheniya AN Kaz. SSR (Institute of Metallurgy and Beneficiation, Ac. of Sci. Kazakh SSR)

SUBMITTED: 00 DATE ACQ: ENCL: 00

SUB CODE: MM NR REF SOV: 006 OTHER: 001

Card 2/2

CHERVYAKOVA, V.V.; BAIMBETOV, N.; PRESNYAKOV, A.A.

Effect of lead concentration on the plasticity of LS59-1 brass at high temperatures. Trudy Inst. met. i obog. AN Kazakh. SSR 10:12-15 '64.
(MIRA 18:7)

STARIKOVA, G.V.; PRESNYAKOV, A.A.

Effect of the speed of tension on the plasticity of LS59-1 brass in the $\alpha \rightarrow \beta$ phase transition region. Trudy Inst. met. i obog. AN Kazakh. SSR 10:16-18 '64. (MIRA 18:7)

PRESNYAKOV, A.A.; CHERVYAKOVA, V.V.; POLYAKOVA, T.P.; NOVIKOV, A.V.; VOLEYNIK, S.N.; BAIMBETOV, N.B.

Investigating the properties of plain and lead β-brass. Trudy Inst. met. i obog. AN Kazakh. SSR 10:25-31 '64. (MIRA 18:7)

L 25736-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(b) IJP(c) JD
ACCESSION NR: AT5001278 S/2817/64/010/000/0032/0054

24
16
B+1

AUTHOR: Presnyakov, A. A.

TITLE: New data on the development of ductility anomalies in solid solutions

SOURCE: AN KazSSR. Institut metallurgii i obogashcheniya. Trudy, v. 10, 1964, Metallovedeniye i obrabotka metallov davleniyem (Metallography and metal working by pressure), no. 3, 32-54

TOPIC TAGS: ductility, solid solution, ductility anomaly, metal lattice, Frenkel defect, cold brittleness, rheotropic recovery, slippage, twinning, lattice defect

ABSTRACT: This is a detailed critical review of published data on the development of ductility anomalies in solid solutions, with particular attention to cold brittleness and rheotropic recovery. Data on Cu, Zn and Al alloys are presented graphically. Quantitative evaluations are made of the following different categories of defects and distortions: (1) distortions of the "solid solution" type, (2) distortions of the "Frenkel defect" type, (3) other types of defects (such as slippage and twinning) and their role in changing the ductility of solid solutions. Orig. art. has: 17 figures and 2 formulas.

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L 25736-65
ACCESSION NR: AT1001278

ASSOCIATION: Institut metallurgii i obogashcheniya Akademii nauk Kazakhskoy SSR (Metallurgy and concentration institute, Academy of sciences, Kazakh SSR)

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 029 OTHER: 001

Card 2/2

SAMOYLOV, V.A.; PIGSNYAKOV, A.A.

Properties of antimony at high temperatures. Trudy Inst. fiz. i tekh. AN Kazakh. SSR 10:67-71 '64. (MIRA 18:7)

AYTKHOZHIN, E.S.; PRESNYAKOV, A.A.

Effect of prestressing on the plasticity and electric resistivity of polycrystalline zirc. Trudy inst. met. i obog. AN Kazakh. SSR 10:75-82 '64.

Effect of the speed of tension on the development of rheotropic recovery in zirc. Ibid.:82-85 (MIRA 18:7)

L 6895-65 EWT(m)/EWP(q)/EWP(b) RAME(t) JD S/0137/64/000/006/I054/I055

ACCESSION NR: AR4044224

41

SOURCE: Ref. zh. Metallurgiya, Abs. 61318

AUTHOR: Fresnyakov, A. A.

TITLE: The nature of cold shortness 18

CITED SOURCE: Tr. In-ta metallurgii i obogashcheniya, AN KazSSR, v. 10, 1964, 86-90

TOPIC TAGS: cold shortness, metal, lattice

TRANSLATION: There is advanced a hypothesis about the fact that in metals revealing the appearance of cold shortness with temperature, there occurs a change in the electron configuration of atoms; for specific reasons these changes lead to the appearance of two kinds of atoms that behave as foreign atoms. It is proposed to distinguish 2 types of cold shortness: true physical cold shortness connected with the appearance of additional binding forces between two kinds of atoms of the same element and impurity cold shortness connected with the appearance of chemical compounds during the filling, with atoms, of elements forming interstitial solid

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L 6895-65

ACCESSION NR: AR4044224

solutions, tetrahedral and octahedral voids in the lattice, i.e., with the formation of a practically new lattice. The appearance of impurity cold shortness is connected with defectiveness of the internal electron shells of atoms of the transitional metals. In light of this hypothesis there is examined the phenomenon of rheotropic recovery, which is a sharp increase in the plasticity of cold-short metals in the zone of brittleness after plastic deformation near the cold-shortness threshold. Rheotropic recovery is caused by three factors: 1) by the influence of plastic deformation on the electron configuration of atoms; 2) by disruption of the order of various kinds of atoms of the metal; and 3) by the appearance of texture. Bibliography: 12 references.

SUB CODE: MM, NP ENCL: 00

Card 2/2

L 16035-65 EWT(m)/EWP(t)/EWP(b) IJP(c)/ASD(a)-5/BSD/AFETR JD
ACCESSION NR: AP4044814 S/0078/64/009/009/2258/2259

AUTHORS: Duysemaliyev, U.K.; Presnyakov, A.A.

TITLE: Solubility of cerium in copper and physical-mechanical properties of copper-cerium alloys

SOURCE: Zhurnal neorganicheskoy khimii, v. 9, no. 9, 1964, 2258-2259

TOPIC TAGS: Copper cerium alloy, cerium in copper solubility, physical mechanical property, microstructure, mechanical property, electric resistance, grain size, copper cerium solid solution

ABSTRACT: The structure and properties of the copper-rich area of the copper-cerium system were investigated by microstructural analysis, mechanical testing and electric resistance measurements. Melts containing 0.03, 0.05, 0.10, 0.15, 0.20, 0.30 and 0.50 wt.% Ce were prepared in a high frequency furnace in an argon atmosphere, annealed at 800C for 150 hours and cooled 100 degrees every 24 hours. Up to 0.1% Ce reduced the grain size of the Cu and formed solid solutions; with more Ce two phases were formed, one containing inclusions of $CeCu_6$. The limit of Ce solubility in Cu at room temperature was 0.10 wt.%. The solubility changed little with increasing tempera-

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L 16035-65
ACCESSION NR: AP4044814

ture, reaching a maximum of 0.15 wt.% at 800C. (fig. 1). Since 0.03-0.05% Ce was used in deoxidation of Cu it was concluded the actual solubility of Ce in Cu was not more than 0.05 wt.%. The microhardness within the solid solution limits was reduced to a minimum at 0.03% Ce at room temperature, 0.05% Ce at 500C and 0.10% Ce at 800C; the microhardness then increased with increase in Ce content (fig. 2). Within the limits of the solid solution, Ce increased the strength and ductility of the alloy; up to 0.1% Ce changed the electric resistance little, but further addition of Ce up to 0.5% increased it. (fig. 3). Orig. art. has: 4 figures

ASSOCIATION: Institut metallurgii i obogashcheniya Akademii nauk Kazakhskoy SSR (Institute of Metallurgy and Enrichment (Concentration) Academy of Sciences Kazansk SSR)

SUBMITTED: 13Mar64 ENCL: 03

SUB CODE: MM,SS NR REF SOV: 002 OTHER: 000

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L 16035-65
ACCESSION NR: AP4044814

ENCLOSURE: 01

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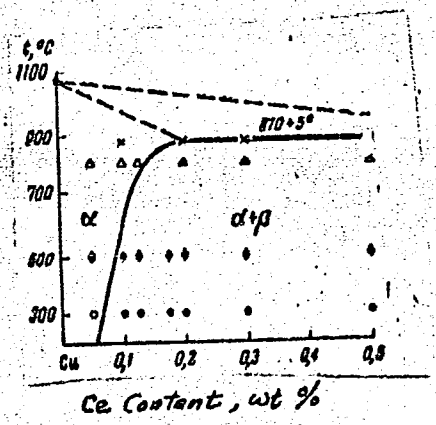

Figure 1
Line of limiting solubility of copper-cerium alloys

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ACCESSION NR: AP4044814

ENCLOSURE: 02

0

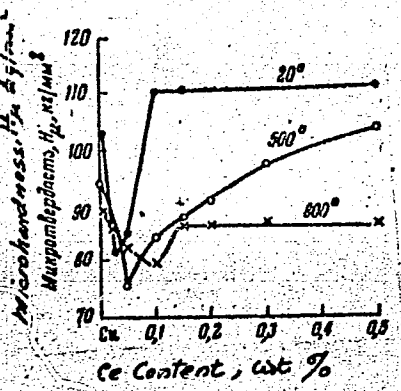

Figure 2

Microhardness of copper-cerium alloys in annealed state at room temperature

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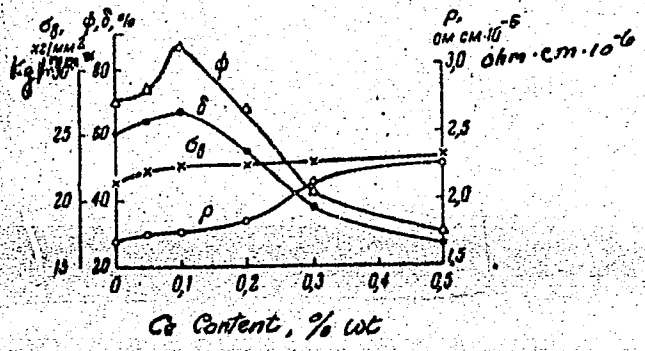

Figure 3
Ductility, strength and electric resistance of copper-cerium alloys at room temperature.

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ACCESSION NR: AP4017366 S/0126/64/017/002/0293/0296

AUTHORS: Klyuchnikov, Yu. F.; Presnyakov, A. A.

TITLE: Anomalous variation of x ray interference structures in brass

SOURCE: Fizika metallov i metallovedeniye, v. 17, no. 2, 1964, 293-296

TOPIC TAGS: brass, x ray analysis, x ray diffraction pattern, lattice parameter variation, annealing, hardening, interference pattern variation

ABSTRACT: A new "oblique" method for x-ray analysis of alloys was developed and used to study detailed processes occurring in the thermal and mechanical treatment of alloys. It involves the rotation of a coarse-grained metal sample around its axis at an angle of $90^{\circ} - \theta$ relative to the incident x-ray beam. A basic requirement of this method is that the incident radiation should produce a reflection at an angle not less than $78\text{-}80^{\circ}$. These reflections make it possible to measure the lattice parameter with sufficient accuracy and to analyze the state of the alloy according to the interference spots. This method was applied to the study of Cu-Zn alloys with 15-40 % by weight Zn. To study the temperature behavior of the alloy structure, the samples were first annealed for 750 hours, followed by a gradual

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ACCESSION NR: AP4017366

cooling from 750C to room temperature. Other samples were quenched from 700, 750 and 800C, with subsequent tempering from 100 to 700C. During tempering of hardened brass samples the anomalous variations were observed in the x-ray interference structures and in the crystalline lattice parameter. These were believed to be related to a process of metal ordering. Maximum anomalous variation was associated with the 750C quench. The change in the time lag at that temperature resulted in the appearance of new lattice parameter anomalies during tempering. The hardening at 800C caused the disappearance of the anomalies observed in the structure of the x-ray reflections. Orig. art. has: 5 figures.

ASSOCIATION: Institut metallurgii i obogashcheniya AN KazSSR (Institute of Metallurgy and Beneficiation, AN KazSSR)

SUBMITTED: 25Feb63 ENCL: 00

SUB CODE: MM NO REF SOV: 006 OTHER: 007

Card 2/2

MELIKHOV, V.D.; KLYUCHNIKOV, Yu.F.; PRESNYAKOV, A.A.

Use of Cu K β-radiation for the study of ordering in Cu-Zn alloys. Zav. lab. 30 no.6:719-721 '64 (MIRA 17:8)

1. Institut metallurgii i obogashcheniya AN Kazakhskoy SSR.

L 55849-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(b) IJP(c) JD

ACCESSION NR: AP5013125 UR/0370/65/000/002/0190/0192
669.75

AUTHOR: Samoylov, V. A. (Alma-Ata); Presnyakov, A. A. (Alma-Ata) 19 B

TITLE: On the properties of antimony at elevated temperatures

SOURCE: AN SSSR. Izvestiya. Metally, no. 2, 1965, 190-192

TOPIC TAGS: antimony, metal mechanical property 16 16

ABSTRACT: Mechanical properties, i.e., fracture strength, hot hardness elongation and reduction in area of cast button head specimens were studied as a function of strain rate and temperature. Four rates of elongation were tested: .02, 0.1, 1.3, 8 mm/sec. Increasing elongation rate was found to have no effect on the fracture strength while ductility (true elongation) strongly increased. Ductile to brittle transition temperature increased from 340-550°C. Commercial purity antimony exhibited brittle fracture at all temperatures and this is attributed to the existence of both a less equiaxed grain size and the visual presence of foreign precipitates in its grain boundaries. Lattice parameter measurements showed a change in the coefficient of thermal expansion occuring at 400°C, this change said to be brought

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ACCESSION NR: AP5013125

about by the same change in interatomic forces that leads to the increased plasticity. Increased temperature leads to increased unit cell size and in the 400°C region a large increase in background radiation on the x-ray film is noticed. These effects are said to result from increased atom mobility. Orig. art. has: 4 figures.

ASSOCIATION: none

SUBMITTED: 02Mar64 ENCL: 00 SUB CODE: MM

NO REF SOV: 003 OTHER: 001

Card 2/2

FRESNYAKOV, A.A.; SAMOYLOV, V.A.; AYTKHOZHIN, E.S.

Structural transformations in β-brass. Fiz. met. i metalloved. 20 no.1:142-143 Jl '65. (MIRA 18:7)

1. Institut metallurgii i obogashcheniya AN KazSSR.

SAMOYLOV, V.A.; [illegible], A.A.

Investigating the effect of the rate of deformation on the plasticity of zinc and β-brass. Fiz. met. i metalloved. 20 no.4:630-632 O '65. (MIRA 18:11)

1. Institut metallurgii i obogashcheniya, g. Alma-Ata.